Packet Cloud: A Cloudlet-Based Open Platform for In-Network Services

The Internet was designed with the end-to-end principle where the network layer provided merely the best-effort forwarding service. This design makes it challenging to add new services into the Internet infrastructure. However, as the Internet connectivity becomes a commodity, users and applications increasingly demand new in-network services. This paper proposes Packet Cloud, a cloudlet-based open platform to host in-network services. Different from standalone, specialized middle boxes, cloudlets can efficiently share a set of commodity servers among different services, and serve the network traffic in an elastic way. Packet Cloud can help both Internet Service Providers (ISPs) and emerging application/content providers deploy their services at strategic network locations. We have implemented a proof-of-concept prototype of Packet Cloud. Packet Cloud introduces a small additional delay, and can scale well to handle high-throughput data traffic. We have evaluated Packet Cloud in both a fully functional emulated environment, and the real Internet.